

Date: Wednesday, 3/26/2008 1:26:36 PM  
User: Kim Johnston

Process Sheet

SPLIT

|                                                |                                      |
|------------------------------------------------|--------------------------------------|
| Customer : CU-DAR001 Dart Helicopters Services | Drawing Name : ROUND BILLET 17-4     |
| Job Number : 38211                             |                                      |
| Estimate Number : 10040                        |                                      |
| P.O. Number :                                  | Part Number : D6104005               |
| This Issue : 3/26/2008 S.O. No. :              | Drawing Number : D6104 REV B         |
| Prsht Rev. : NC                                | Project Number : N/A                 |
| First Issue : 1 / Type : MACHINED PARTS        | Drawing Revision : B                 |
| Previous Run :                                 | Material :                           |
| Written By : <u>08 03 26</u>                   | Due Date : 4/4/2008 Qty: 30 Um: Each |
| Checked & Approved By : <u>08 03 26</u>        |                                      |
| Comment : Est. A: 01.05.08 New Issue EC        |                                      |

Additional Product

Job Number:



Seq. #:

Machine Or Operation:

Description :

1.0 PG

PG

PURCHASING



Comment: PURCHASING

Issue P/O: 5994

C 208 103/24

a) Description: S.S round billet

b) Ø4.00" x 5.10" long

c) Tolerance on all dimensions are +0.030"/-0.000"

(30)

d) Material: 17-4PH Stainless steel (Ams 5643 or Aisi 630)

e) One blank makes 2 parts

f) Material certification required

2.0

D6104005P

17-4 SS Roundbar 4.00"OD



Comment: Qty.: 1.0000 Each(s)/Unit Total : 30.0000 Each(s)

17-4 SS Roundbar 4.00"OD

3.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Receive & Inspect For Transit Damage

Ensure material certification is attached

12/4/4

(24)

4.0

QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

Ensure Material certification comply to Dwg D6104

9mh 08/04/04

24

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                                |                                 |                |                           |                       |                          |
|------|------|----------------------------------|--------------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action<br>Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng           | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                                |                                 |                |                           |                       |                          |
|      |      |                                  |                                |                                 |                |                           |                       |                          |
|      |      |                                  |                                |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

# Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: ROUND BILLET 17-4

Job Number: 38211

Part Number: D6104005

Job Number:



Seq. #:

Machine Or Operation:

Description :

5.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: *CNK*

*08/04/08*

6.0

QC21

FINAL INSPECTION/W/O RELEASE



*08/04/08*

Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



*mf 08-04-08*

*u*

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                                |                                 |                |                           |                       |                          |
|------|------|----------------------------------|--------------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action<br>Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng           | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                                |                                 |                |                           |                       |                          |
|      |      |                                  |                                |                                 |                |                           |                       |                          |
|      |      |                                  |                                |                                 |                |                           |                       |                          |

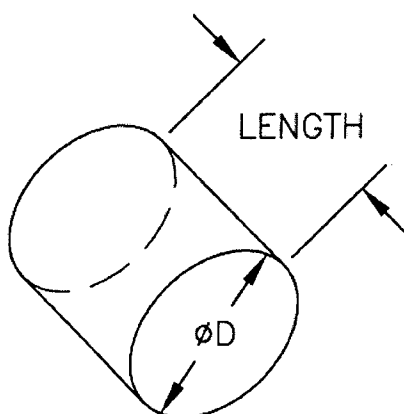
NOTE: Date & initial all entries



|                  |              |                                                                        |                        |
|------------------|--------------|------------------------------------------------------------------------|------------------------|
| DESIGN<br>FF     | DRAWN BY<br> | DART AEROSPACE LTD<br>HAWKESBURY, ONTARIO, CANADA                      |                        |
| CHECKED<br>      | APPROVED<br> | DRAWING NO.<br>D6104                                                   | Rev. B<br>SHEET 1 OF 1 |
| DATE<br>02.11.25 |              | TITLE<br>ROUND BILLET, 17-4                                            | SCALE<br>NTS           |
| A                | 01.04.10     | NEW ISSUE                                                              |                        |
| B                | 02.11.25     | CLARIFY ALLOY SPEC<br>ADDED D6104-009/-011<br>REDUCE LENGTH OF BILLETS |                        |

RELEASED  
02.11.29

## SPECIFICATION CONTROL DRAWING



MATERIAL: 17-4 PH SS (AMS 5643 OR AISI 630) MIN UTS = 170 KSI (38 HRc)

PURCHASE MATERIAL ACCORDING TO THE FOLLOWING TABLE. SPECIFY ALLOY, DIAMETER x LENGTH (+0.030/-0.000) AS SHOWN.

TOLERANCE ON ALL DIMENSIONS IS +0.030/-0.000.

ALL DIMENSIONS ARE IN INCHES

| Part No.  | Alloy                   | D<br>(Diameter) | Length |
|-----------|-------------------------|-----------------|--------|
| D6104-001 | 17-4 PH STAINLESS STEEL | Ø3.00           | 3.80   |
| D6104-003 | 17-4 PH STAINLESS STEEL | Ø3.25           | 3.80   |
| D6104-005 | 17-4 PH STAINLESS STEEL | Ø4.00           | 5.10   |
| D6104-007 | 17-4 PH STAINLESS STEEL | Ø4.50           | 5.10   |
| D6104-009 | 17-4 PH STAINLESS STEEL | Ø5.25           | 4.10   |
| D6104-011 | 17-4 PH STAINLESS STEEL | Ø6.50           | 4.10   |
|           |                         |                 |        |
|           |                         |                 |        |

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 38211

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P.O. BOX 977  
SYRACUSE  
NEW YORK 13201

# CERTIFICATE OF TEST

36039

|                                      |                                              |                            |                                              |                          |
|--------------------------------------|----------------------------------------------|----------------------------|----------------------------------------------|--------------------------|
| S<br>O<br>L<br>D<br>T<br>O           | ASA ALLOYS INC                               | S<br>H<br>I<br>P<br>T<br>O | ASA ALLOYS INC                               | OUR ORDER NO.            |
|                                      | 81 STEINWAY BLVD<br>ETOBICOKE ONTARIO M9W6H6 |                            | 81 STEINWAY BLVD<br>ETOBICOKE ONTARIO M9W6H6 | 12                       |
| CUSTOMER ORDER # & DATE<br>040850-CV |                                              | CUSTOMER REQ. #            |                                              | DATE<br>03/04/04         |
| DISTRICT                             |                                              | B PARSONS                  |                                              | SHIPPED FROM<br>SYRACUSE |

## DESCRIPTION OF MATERIAL

CRU 17CR-ANI RTA

AMS-5643Q

ASTM A564-02

ASME-SA564-01ED

ASTM-A484-03A

EN 10 2043.1-B

## SIZE

4.500 RD

## HEAT NO.

## CHEMICAL ANALYSIS

| HEAT NO. | C    | MN  | P    | S    | SI  | NI   | CR    | MO  | CU   | CB  | TA   |
|----------|------|-----|------|------|-----|------|-------|-----|------|-----|------|
| A15171   | .040 | .66 | .027 | .018 | .70 | 4.16 | 15.17 | .23 | 3.23 | .31 | .009 |

## QUANTITY

## HEAT NO.

## MECHANICAL PROPERTIES

6212 # A15171 YLD.2%PSI TENSILE PSI XELONG2IN RED/AREAZ HARDNESS  
BHN 352/ 354  
CAPABILITY PHYSICALS AFTER 900 DEG. F. - 1 HR. AIRCOOL:  
182,220 199,710 13.0 51.1 BHN 401

MACRO TEST OK  
MICRO TEST OK  
FERRITE 3 %

MATERIAL FREE FROM MERCURY CONTAMINATION AT TIME OF SHIPMENT  
NO WELD REPAIR PERFORMED  
MATERIAL MELTED IN U.S.A.

THANK YOU FOR SELECTING A QUALITY PRODUCT  
MANUFACTURED BY THE EMPLOYEES OF CRUCIBLE SPECIALTY METALS JW

SWORN TO AND SUBSCRIBED BEFORE ME THIS

DAY OF . 20

NOTARY PUBLIC

WILLIAM E MASTROE- MANAGER QUALITY ASSURANCE

CERTIFIED  
BY:

THE ABOVE MATERIAL WAS MANUFACTURED AND TESTED IN ACCORDANCE  
WITH ABOVE SPECIFICATIONS AND IS IN CONFORMANCE WITH THOSE  
SPECIFICATION REQUIREMENTS.

CRUCIBLE MATERIALS CORPORATION  
ACTING BY AND THROUGH ITS SPECIALTY METALS DIVISION

WILLIAM E MASTROE  
QUALITY ASSURANCE REPRESENTATIVE

**CERTIFICATE OF TESTS**  
**CERT SERIAL# 000577659**
**ABNAHMEPRUEFZEUGNIS**
**CERTIFICAT DE CONTROLE**

**TALLEY METALS**  
**A Carpenter Company**

Talley Metals Technology, Inc.  
205 Talley Metals Lane  
MaBee, SC. 29101 Tel: (610) 208-2000 (800) 338-4592

01/22/07

CUSTOMER/BESTELLER/CLIENT

SELLER/VERKÄUFER/VENDEUR PAGE 1 OF 2

**MAGNA INOXYDABLE STAINLESS, INC**  
**525 MELOCHE AVE.**  
**DORVAL**  
**QUEBEC**  
**H9P 2W2**, CANADA

**TALLEY METALS TECH, INC.**  
**ACCOUNTS PAYABLE**  
**P. O. BOX 2498**  
**HARTSVILLE**, SC 29551

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE

CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE

DATE/DATUM/DATE

WEIGHT/GEWICHT/POIDS

063970-JC-008

W53994

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEUR:

G12306

**PRODUCT DESCRIPTION: TYPE 17-4 SOLUTION ANNEALED ROUGH TURNED**
**SPECIFICATION: TALLEY 174-T1A CAP OF H900 (01/11/99)**

AMS 2303 REV E (10/ /01)

AMS 2315 (REAFFIRMED) REV E (04/ /06)

AMS 5643 REV Q (01/ /03) (EXCEPT CD ROUND CHEM &amp; MECH PROPS ONLY)

ASTM-A484-05A

ASTM-A564-04

ASME-SA564 2004 EDITION

**SIZE 4.000000 IN. (101.60 MM) RD BAR**
**PRIMARY HEAT CHEMISTRY (WT%): (TEST METHOD IS SHOWN IN PARENTHESIS)**

|          |          |          |         |          |          |
|----------|----------|----------|---------|----------|----------|
| C (COM)  | MN (XRF) | SI (XRF) | P (XRF) | S (COM)  | CR (XRF) |
| 0.026    | 0.85     | 0.30     | 0.021   | 0.027    | 15.23    |
| NI (XRF) | MO (XRF) | CU (XRF) | N (FUS) | CB (XRF) | TA (XRF) |
| 4.18     | 0.33     | 3.74     | 0.030   | 0.25     | LT .01   |
| CB+TA    |          |          |         |          |          |
| 0.26     |          |          |         |          |          |

**DISCS MACROETCHED AND APPROVED**
**HARDNESS AS SHIPPED, HB - 340 (MIDRADIUS)**
**MAGNETIC PARTICLE: FREQUENCY = 0 / SEVERITY = 0**
**MICROSTRUCTURE - FERRITE .40%**
**CAPABILITY**
**900 F ( 482 C), 01 HR AIR COOL**
**HARDNESS, HB - 423.0**
**SOLUTION ANNEALED 1900 F - 1 HOUR - RAPID COOL (CONVERTED FROM TENSILE STRENGTH)**

CONTINUED ON NEXT PAGE

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or certification to other parties.  
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 Ce certificat est uniquement valable pour le client dont le nom est imprimé sur ce formulaire. Carpenter n'assume pas de responsabilité pour une certification vis-à-vis d'une tierce personne.

BS - 883 (REV)

FORM 12-366

## CERTIFICATE OF TESTS

## ABNAHMEPRUEFZEUGNIS

## CERTIFICAT DE CONTROLE

CERT SERIAL# 000577659


**TALLEY METALS**  
 A Carpenter Company

 Talley Metals Technology, Inc.  
 205 Talley Metals Lane  
 McBee, SC. 29101 Tel: (610) 208-2000 (800) 338-4592

01/22/07

CUSTOMER / BESTELLER / CLIENT

SELLER / VERKÄUFER / VENDEUR PAGE 2 OF 2

 MAGNA INOXYDABLE STAINLESS, INC  
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 QUEBEC  
 H9P 2W2 , CANADA

 TALLEY METALS TECH, INC.  
 ACCOUNTS PAYABLE  
 P. O. BOX 2498  
 HARTSVILLE , SC 29551

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE

CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE

DATE/DATUM/DATE

WEIGHT/GEWICHT/POIDS

063970-JC-008

W53994

HEAT NUMBER / SCHMELZE-NR. / N° DE COULBEE :

CAPABILITY

900 F ( 482 C ), 01 HR

G12306

AIR COOL

|                                    |                |
|------------------------------------|----------------|
| YIELD STRENGTH, (0.20 %) KSI (MPA) | 190.0 ( 1310 ) |
| TENSILE STRENGTH, KSI (MPA)        | 213.0 ( 1469 ) |
| ELONGATION IN 2.00", %             | 13.0           |
| REDUCTION OF AREA, %               | 41.0           |
| HARDNESS, HB                       | 419.0          |

( CONVERTED FROM TENSILE STRENGTH )

NO WELD REPAIR PERFORMED

MATERIAL PRODUCED ON THIS ORDER WAS MELTED AND MANUFACTURED IN THE U.S.A.  
 MATERIAL SUPPLIED COMPLIES WITH THE REQUIREMENTS OF DFARS 252.225.7014  
 (JUNE 2005) ALT.1 AND SUBSECTION 225.872.1.  
 WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE  
 PURCHASE ORDER AND SPECIFICATION REQUIREMENTS. CERTIFICATE OF TEST IS  
 PREPARED IN ACCORDANCE WITH PARAGRAPH 3.1B OF EN 10204 (DIN50049)

 TIMOTHY DUVAL  
 QUALITY ASSURANCE REP.  
 CARPENTER TECHNOLOGY CORPORATION

*Timothy M. Duval*